

**BIOMETRIC STUDIES ON *ASPIUS VORAX* HECKEL FROM
BASRAH WATERS**

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About sixty percent of the freshwater fish production of Iraq comes from Basrah and the surrounding marshes. *Aspius vorax* Heckel, which constitutes the bulk of the freshwater collection, forms an important commercial fish. The present work deals with the biometric studies (morphometric and meristic characters) on *A. vorax*. It is a part of the program organized by the Biology Department of the Basrah University to study the biology of the commercially important fishes in the marshes near Basrah and in the Shatt-Al-Arab river.

MATERIAL AND METHODS

Samples of *A. vorax* were obtained from the commercial catches in Ashar market at Basrah. The availability of this fish varied during the period of collection between January and June 1974. It was available in great quantities from January to April and less so in May and June.

Morphometric measurements (standard length, predorsal length, preanal length, preventral length, head length, and eye diameter) and meristic counts (gill-rakers, dorsal, pectoral, anal fin-rays and vertebrae) were taken to the nearest millimetre using the procedures that were outlined by Lagler (1956), Hubbs and Lagler (1957), Lagler, Bardach and Miller (1962), Beckman (1962), and Zupanovic (1968).

RESULTS AND DISCUSSION

Morphometric Characters

(a) Ratio Indices

Morphometric indices of each of the previous measurements stated for 271 fishes of *A. vorax* were calculated as a numerical ratio to the standard length. Table 1 shows the morphometric indices for the species, under investigation, in which all the fishes are grouped in one centimetre length groups.

(b) Morphometric Regressions

The observed values of six morphometric characters namely, standard length, preanal length, preventral length, predorsal length, head length and eye diameter are plotted against the total length as a scatter diagram in Figure 1.

In Table 2 the observed values and those calculated of the previous six morphometric characters (using regression equations) are compared. Figure 2 shows the comparison between observed and calculated morphometric measurements.

The close fitness of the mean observed values on the straight lines show that the regression equations expressing straight lines are correct and they fit the morphometric characters in question.

Meristic Characters

Counts made on gill-rakers, trunk and caudal vertebrae, and pectoral, anal and dorsal fin-rays are shown in Table 3. As to the gill-raker count, no significant trend of change was apparent, and the number of vertebrae were constant. As to the dorsal, pectoral and anal fin-ray count it showed a slight variation.

From the Table 1 it is clear that the values of the different morphometric indices show a slight variation around the mean within the whole length range.

Referring to Figure 2 the straight lines expressing the regression of the different morphometric parameters with the total fish length indicate that isometric growth occurs. This backs Kesteven's (1950) preference to define the morphometric characters of a fish species in terms of regression equations, being more reliable than the use of indices.

Gunther (1868), Khalaf (1961), Mahdi (1962), and Beckman (1962) described *A. vorax* and mentioned that the S.L./H.L. is equal to 4. In the present work this index is found to be as 3.29. The other characters which are observed in the present work are more or less similar to those recorded by the above authors.

SUMMARY

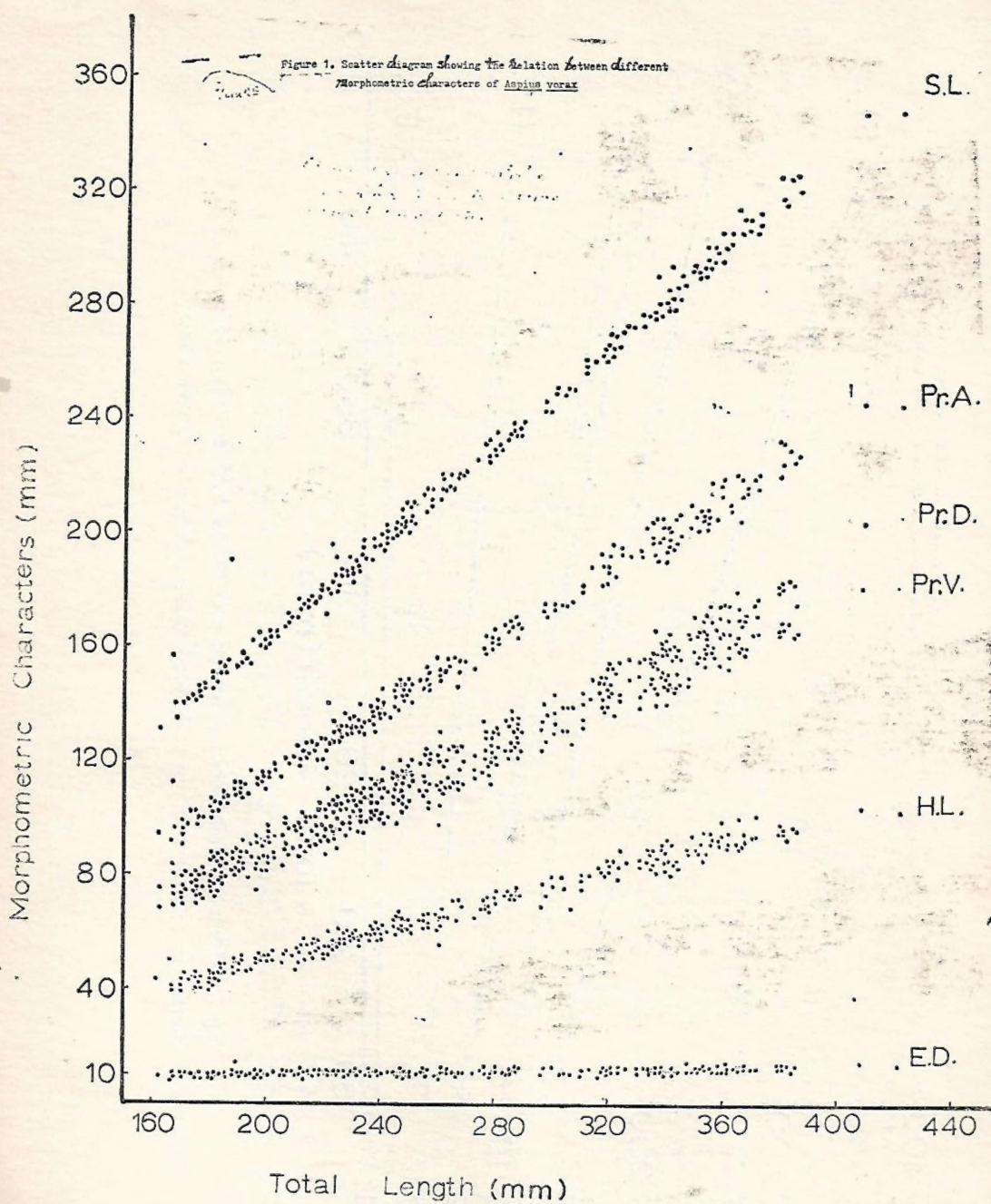
Regression equations of the morphometric indices and the meristic counts on gill-raker, dorsal, anal and pectoral fin-rays, and the vertebrae obtained from a study on *A. orax* Heckel from Basrah, Iraq are presented.

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الخلاصة

يتضمن هذا البحث دراسة وتثبيت الصفات المظهرية لسمكة الشلج (*Aspius vorax*) على اسس رياضية وتميزها عن بقية أنواع الأسماك التي تعود إلى نفس الجنس إن وجدت في المياه التابعة لمحافظة البصرة - العراق .



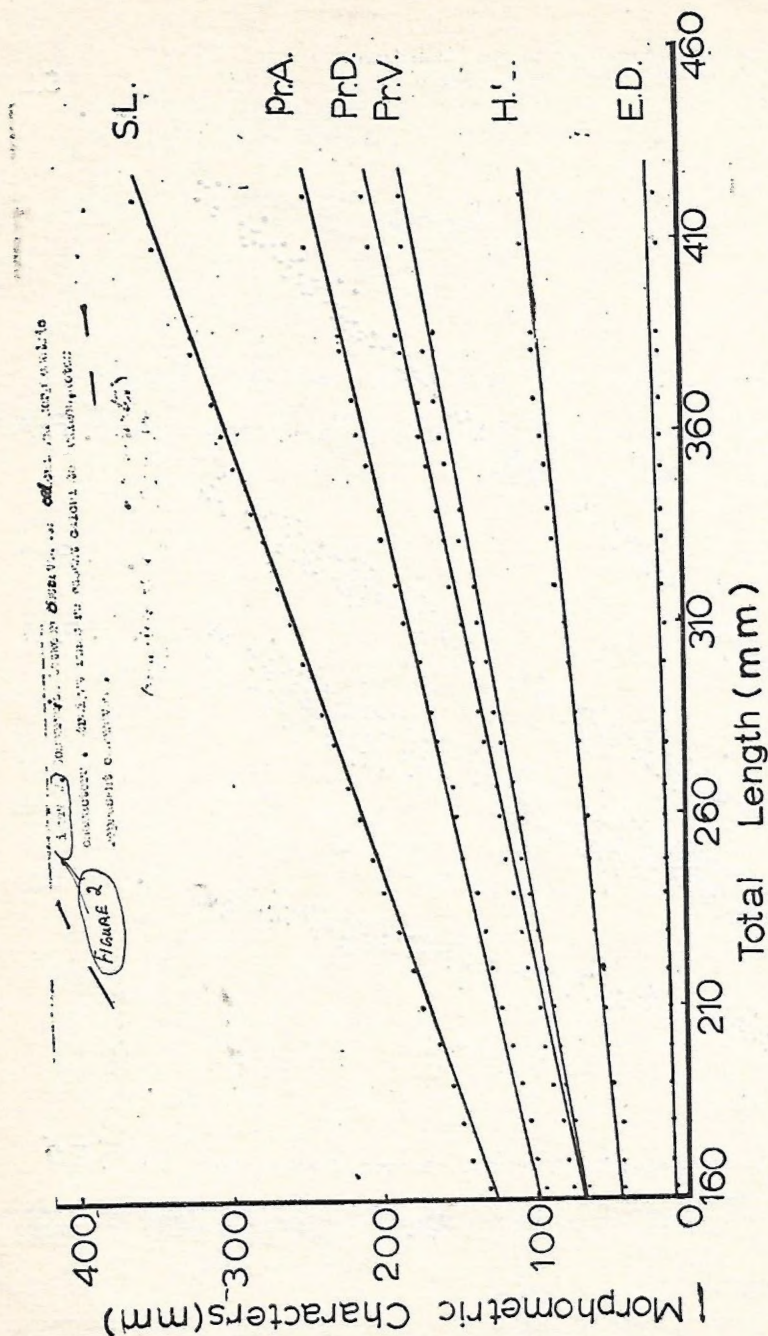


Fig 2. Comparison between observed and calculated morphometric characters : straight line - calculated values; dots - observed values,

TABLE 1. Morphometric indices for different measurements of *Aspius vorax*.

Total length groups (mm.)	No.	T.L./S.L. Ratio	S.L./P.D. Ratio	S.L./Pr.D. Ratio	S.S./Pt.A. Ratio	S.L./Pr.L. Ratio	S.S./Fr.V. Ratio	S.L./H.L. Ratio	S.L./B.D. Ratio	H.L./Pr.O. Ratio	H.L./I.O. Ratio	H.L./E.D. Ratio
155-164	1	1.24	1.49	1.75	1.24	1.39	1.93	3.05	4.23	3.58	4.30	4.78
165-174	9	1.20	1.51	1.77	1.26*	1.43	1.93	3.32	4.09	3.58	4.02	4.52
175-184	20	1.22	1.53	1.79	1.28	1.44	1.97	3.42	4.60	3.42	4.25	4.55
185-194	14	1.22	1.51	1.78	1.25	1.42	1.90	3.24	4.30	3.36	4.27	4.56
195-204	12	1.22	1.52	1.77	1.25	1.43	1.94	3.23	4.30	3.46	4.45	5.00
205-214	13	1.22	1.53	1.78	1.26	1.43	1.95	3.32	4.65	1.48	4.31	4.99
215-224	20	1.22	1.52	1.76	1.25	1.43	1.94	3.31	4.50	3.33	4.25	5.21
225-234	18	1.22	1.52	1.76	1.25	1.43	1.92	3.26	4.58	3.36	4.43	5.33
235-244	20	1.21	1.53	1.79	1.26	1.44	1.94	3.28	4.59	3.27	4.51	5.59
245-254	17	1.21	1.51	1.78	1.25	1.45	1.89	3.15	4.45	3.23	4.57	5.98
255-264	14	1.22	1.52	1.83	1.26	1.43	1.95	3.34	4.62	3.27	4.77	5.98
265-274	6	1.21	1.54	1.79	1.27	1.45	1.96	3.29	4.68	3.21	4.68	6.22
275-284	12	1.21	1.51	1.78	1.25	1.42	1.92	3.26	4.54	3.27	4.44	6.17
285-294	7	1.21	1.51	1.77	1.25	1.42	1.89	3.23	4.39	3.32	4.42	6.04
295-304	7	1.21	1.53	1.79	1.25	1.42	1.91	3.31	4.53	3.37	4.60	6.34
305-314	5	1.20	1.52	1.78	1.21	1.42	1.90	3.38	4.34	3.29	4.36	5.70
315-324	11	1.20	1.51	1.76	1.25	1.40	1.88	3.22	4.07	3.17	4.48	5.91
325-334	7	1.26	1.45	1.72	1.24**	1.35	1.82	3.11	4.31	3.25	4.70	6.90
335-344	18	1.14	1.52	1.77	1.25	1.43	1.91	3.28	4.45	3.20	4.56	7.13
345-354	11	1.19	1.52	1.77	1.25	1.43	1.90	3.29	4.20	3.18	4.59	6.87
355-364	10	1.29	1.51	1.75	1.24	1.41	1.90	3.28	4.216	3.12	4.49	7.21
365-374	8	1.05	1.52	1.79	1.24	1.43	1.90	3.26	4.26	3.20	4.62	7.08
375-384	6	1.19	1.52	1.76	1.24	1.41	1.92	3.35	4.40	3.16	4.61	7.20
385-394	1	1.20	1.53	1.83	1.23	1.41	1.94	3.33	4.44	3.20	4.60	6.86
405-414	1	1.18	1.53	1.77	1.23	1.41	1.92	3.34	4.44	3.20	4.60	6.86
415-424	1	1.28	1.49	1.73	1.26	1.46	1.96	3.47	3.88	3.03	3.96	7.36
435-444	1	1.20	1.49	1.73	1.24	1.43	1.93	3.47	3.85	3.36	3.96	5.53
Mean		1.20	1.59	1.77	1.25	1.42	1.92	3.29	4.38	3.28	4.42	6.08

Note:— T.L. = Total length, S.L. = Standard length, Pr.D. = Predorsal length, Pt.A. = Postanal length, Pr.V. = Preventral length, H.L. = Head length, B.D. = Body depth, Pr.O. = Preorbital, I.O. = Interorbital, E.D. = Eye depth.

* 8 in number.

** 6 in number.

TABLE 2. a comparison between calculated (cal.) and observed (obs.) morphometric measurements of *Aspilum vorax*.

Total length group (mm.)	Standard length		Predorsal length		Preventral length		Head length		Eye diameter		Eye diameter	
	Obs.	cal.	Obs.	cal.	Obs.	cal.	Obs.	cal.	Obs.	cal.	Obs.	cal.
155-164	13.1	13.171	7.5	6.938	9.4	10.039	6.8	7.444	4.3	4.428	0.9	0.985
165-174	14.2	13.764	8.0	7.302	9.9	10.426	7.4	7.137	4.3	4.591	1.0	0.996
175-184	14.8	14.764	8.5	7.822	10.3	10.980	7.5	8.156	4.3	4.824	1.0	1.011
185-194	15.5	15.435	8.7	8.343	10.9	11.533	8.1	8.575	4.8	5.957	1.0	1.026
195-204	16.3	16.306	9.2	8.863	11.4	12.086	8.4	9.099	5.1	5.190	1.0	1.041
205-214	17.3	17.153	9.7	9.383	12.1	12.640	8.9	9.613	5.2	5.523	1.0	1.057
215-224	18.1	18.000	10.3	9.903	12.7	13.249	9.3	10.251	5.5	5.766	1.1	1.087
225-234	18.9	18.847	10.7	10.424	13.2	13.747	9.8	10.670	5.8	5.989	1.1	1.103
235-244	19.8	19.694	11.1	10.944	13.8	14.300	10.2	11.047	6.0	6.221	1.1	1.116
245-254	20.5	20.457	11.6	11.412	14.5	14.798	10.9	11.508	6.3	6.431	1.1	1.133
255-264	21.3	21.389	12.1	11.985	14.9	15.407	11.3	11.843	6.4	6.887	1.1	1.145
265-274	22.1	22.067	12.4	12.401	15.3	15.850	11.5	12.303	6.7	6.874	1.2	1.162
275-284	23.0	22.999	12.9	12.973	16.2	16.459	12.5	12.639	7.1	7.130	1.2	1.175
285-294	23.6	23.576	13.3	13.389	17.4	17.620	13.0	13.183	7.5	7.619	1.2	1.194
295-304	24.7	24.718	13.8	14.006	18.1	18.174	13.5	13.602	8.2	8.085	1.2	1.225
305-314	25.7	25.625	14.5	14.506	18.9	18.727	14.1	14.021	8.5	8.364	1.2	1.243
315-324	26.6	26.472	15.1	15.106	19.7	19.391	14.6	14.524	8.9	8.550	1.2	1.256
325-334	27.5	27.489	15.5	15.731	19.8	19.834	14.8	14.859	8.6	8.807	1.3	1.272
335-344	28.3	28.167	16.0	16.147	20.6	20.443	15.5	15.020	8.9	8.993	1.3	1.285
345-354	29.4	29.098	16.6	16.719	21.3	21.384	15.9	15.655	9.2	9.203	1.3	1.298
355-364	30.1	29.776	17.2	17.136	21.6	21.804	16.2	16.032	9.5	9.505	1.3	1.318
365-374	30.8	30.539	17.2	17.604	22.7	22.103	16.1	16.576	9.6	9.622	1.4	1.326
375-384	32.0	31.640	18.2	18.280	22.7	22.390	16.5	16.785	9.6	9.622	1.4	1.361
385-394	32.0	32.064	18.5	18.540	22.7	22.653	18.1	17.749	10.4	10.157	1.4	1.381
405-414	34.7	34.012	20.3	19.737	24.5	24.372	18.2	18.594	10.3	10.460	1.4	1.411
415-424	35.7	35.114	20.6	20.413	—	—	—	—	—	—	—	—
425-434	—	—	—	—	—	—	—	—	—	—	—	—
435-444	—	—	—	—	27.0	23.580	19.9	19.969	11.1	11.392	1.4	1.442
445-454	38.5	38.502	22.2	22.495	—	—	—	—	—	—	—	—
455-464	—	—	—	—	—	—	—	—	—	—	—	—

Table 3. Meristic Counts on Aspius vorax

Gill rakers	Frequency No.	Vertebrae	Fin ray		
			Dorsal *	Pectoral	Anal
	Frequency No.	Frequency No.	Frequency No.	Frequency No.	Frequency No.
37	11	271	37	1	8
231	12			14	4
2	13			56	155
				117	107
				88	5
				9	10
Total	270	271	271	271	271
Mean Average	11.93	37	9.15	16.18	11.42

Note:- * each dorsal fin possesses two spines.